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nm during the polishing step so that the light passes through the semiconductor device or the patterned layer intermediate and reaches said at least one layer,  
measuring the intensity of the light reflected by said at least one layer,  
calculating the thickness of said at least one layer based on the intensity of the reflected light, and  
terminating the polishing step when the layer thickness reaches a predetermined value.

62. (Amended) A method for manufacturing a semiconductor device or a patterned intermediate or a silicon-on-insulator wafer from a substrate comprising the steps of  
chemically mechanically polishing at least one film on a front side of the substrate, wherein the substrate comprises at least one layer which is composed of a silicon material and wherein said at least one film is composed of a material selected from the group consisting of silicon oxide, silicon nitride, and poly-silicon,  
illuminating said at least one film by shining light from a back side of the substrate through the substrate to said at least one film causing light to reflect off of said at least one film, wherein the illuminating light has at least one wavelength of energy near or below the bandgap energy of the silicon material of the substrate,  
analyzing thickness of said at least one film based on interferometry and based on the reflected light, and  
stopping polishing when the film thickness reaches a predetermined value.

68. (Amended) A method of removing at least a portion of a layer that is carried on a first side of a substrate, comprising:  
applying a material removing substance to an exposed surface of said layer but not to a second side of the substrate opposite said first side, said substance being characterized by modifying electromagnetic radiation incident thereon, whereby material is removed from said layer exposed surface but not from the second side of the substrate,

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directing a first beam of electromagnetic radiation against said second side of the substrate to said layer through said substrate, said first beam of electromagnetic radiation including a wavelength band to which each of said substrate and said layer is substantially transparent,

receiving and detecting a second beam of electromagnetic radiation within said wavelength band that is a portion of said first beam that exits the second substrate side after reflection at boundary surfaces of said layer and said substrate, and

concurrently with material being removed from the exposed surface of the layer, monitoring a varying intensity of a component of the detected second beam which results from an interference between portions of the first beam reflected

from said exposed surface and an underlying boundary surface,

wherein said exposed layer surface is irregular with raised and depressed areas thereacross, the material removing substance applied to the exposed layer surface is a slurry of abrasive particles, and material is removed from the layer exposed surface by urging the slurry against the layer exposed surface with a planar surface and providing relative motion between the layer exposed surface and the planar surface.

82. (Amended) A process of removing material carried by a first side of a substrate that is held for processing, comprising the steps of:

placing the first side of the substrate in contact with a material removing substance,

directing through a second side of the substrate and against said material an electromagnetic radiation beam having a wavelength band to which said substrate and said material are substantially transparent, and

detecting a particular characteristic of the state of the material removal process from a component of the radiation beam reflected from said material through said second substrate side, said component having an intensity which varies over time from interference between portions of the radiation beam reflected from different boundary surfaces as said material is being removed,

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wherein the material being removed is from a layer of said material that is different from the substrate, and wherein said boundary surfaces include surfaces of said layer,

wherein the placing step includes placing the first side of the substrate in contact with an abrasive medium, and the process further comprises the step of providing relative motion between the first side of the substrate and said abrasive medium.--

Please add claim 87.

-- 87. (New) A process of removing material carried by a first side of a substrate that is held for processing, comprising the steps of:

placing the first side of the substrate in contact with a material removing substance, directing through a second side of the substrate and against said material an electromagnetic radiation beam having a wavelength band to which said substrate and said material are substantially transparent, and

detecting a particular characteristic of the state of the material removal process from a component of the radiation beam reflected from said material through said second substrate side, said component having an intensity which varies over time from interference between portions of the radiation beam reflected from different boundary surfaces as said material is being removed,

wherein the material being removed is from the substrate itself,

wherein the placing step includes placing the first side of the substrate in contact with an abrasive medium, and the process further comprises the step of providing relative motion between the first side of the substrate and said abrasive medium. --